

A. (Micr.) forpicatus Neum. 1880. F.n.sp. Voorkomen : Groote We-
tering bij Kaathoven, Augustus.

A. (Micr.) octagonus Halb. 1906. Van deze zeer zeldzame water-
mijt werd nu ook een ♀ gevangen in een weideplas bij Nieuwkuik,
April. Dit ♀ werd in 1911 door Koenike beschreven onder den naam
insulanus (Cf. Halbert, 1944 in Proc. r. Irish Ac. Vol. L., Sect. B.,
No. 4., pag. 41 en 97).

A. (s.str.) cuspidator (O.F.M. 1776).

In Maart 1941 werd gevischt in het ven bij Nuland. Slechts weinig
mijten werden gevangen : enkele adulti van *Hydryphantes ruber* (De
Geer), een *Piona*-spec.-nympha en voorts een ei-dragend ♀ van boven-
gen. *A.*-soort. Het is m.i. niet twijfelachtig, dat dit ♀ in dezen staat
heeft overwinterd. De voorafgaande winter was zeer streng.

A. (s.str.) radiatus Piers. 1894. F.n.sp. Voorkomen : Sloot Vlijmen,
Juni.

A. (s.str.) batillifer Koen. 1896. F.n.sp. Voorkomen : Sloot den Dun-
gen, Mei ; Ven St. Oedenrode, Augustus.

A. (s.str.) jalciger Viets 1908.

Hier toe behoort *A. mediorotundatus* Rom. 1920, uit de Z.W. Vaart,
9.VIII.1918 (Water, Bodem, Lucht, 10e Jaarg., Afl. 1 en 2).

A. (s.str.) distans Walter 1927. F.n.sp. Voorkomen : Kolk, Ootmar-
sum, Augustus.

A. curvisetus Viets 1936. F.n.sp. Voorkomen : Plas ten Z.O. van
Utrecht, April.

's Hertogenbosch, Koningsweg 30, Maart 1947.

A Note on the Biology of *Anthophora acervorum* L. (Hym. Apid.)

by

J. P. VAN LITH.

In the beginning of May 1946 my attention was drawn to a colony
of *Anthophora acervorum* L., situated at Rotterdam along the back of a
big building, on the south-eastern side. The ground is very slightly slo-
ping and consists of sandy clay, nearly without vegetation on the site of
the colony. Over the colony is a concrete verandah, so that the nests are
more or less protected from the rain. From the appearance of the many old
and abandoned cells the colony must have been there last year already.

On the 11th of May, whilst there was a cold wind blowing and the
sun was no longer shining on the colony, about ten females were still
very busy bringing home their pollen. Often I noticed a female with
pollen on her legs fighting with a female without pollen, which had
evidently tried to enter the nest of the first bee illegally. The cells were
lying very near the surface at a depth of a few centimeters only, or
10 cm. at the utmost, whereas the old cells of the previous year were
for the greater part lying in the open. Fabre (Souvenirs Entomolo-
giques, deuxième série, part II, p. 277—370) on the contrary describes
a colony of *Anthophora pilipes* (= *acervorum* L.) which he found in
about 1855 in an almost perpendicular wall in which the curved tunnels
were a few decimeters long.

Owing to the many old cells in the ground I did not succeed in finding
any system in the situation of the tunnels or cells. In some cases that I
examined I found that at least 2 cells were lying one after another,
separated by a layer of clay of about 5 mm. thick. Just as can be seen
on a picture in Fabre, the longitudinal axis of the cells has a very

different position. As a rule the cells were standing almost upright, but some of them had a very oblique position. Thus I possess a piece of clay with two cells in it, which are both forming an angle of about 40 degrees with the horizontal axis. The cells are egg-shaped, with a flat upper side, with which the longitudinal axis of the cell is never perpendicular but always oblique.

The inside of the cells is covered with a rather thick layer of wax of a whitish-grey colour. B i s c h o f f (Biologie der Hymenopteren, 1927) only mentions the statement of F e r t o n (Notes détachées sur l'instinct des Hyménoptères mellifères et ravisseurs. Ann. Soc. entom. Fr., 9e série, 1920) that *Anthophora ferruginea* Lep. covers the inside of the cell with a thin layer of wax, as well as the endpart of the headtunnel, but B i s c h o f f does not say anything about *acervorum*. F a b r e too does not mention the wax covering. Contrary to *Anth. ferruginea* the layer of wax does not continue into the tunnel, but is restricted to the inside of the cell. This layer of wax is very solid and so firm that I managed to soften and wash off the surrounding clay with a thin jet of water, so that there was a little cell of wax left, like a very fragile egg-shell.

The slightly convex upper side of the cell also consists of wax, and shows a more or less spiral structure. In the middle of this lid there is a raised part with a small oval aperture in the side at an angle preventing sand or dust from falling into the cell. Probably this aperture is to regulate the atmosphere in the cell which otherwise is closed, being airtight and watertight. The clay round the cells is harder than the rest of the soil and was most likely drenched by saliva when the motherbee smoothed the wall. The clay on top of the lid too is very cohesive and does not easily soften in the water.

The cells were about half filled with a semi-liquid mass of pollen and honey, which had a very strong smell (F a b r e says that the cells he found contained "un miel coulant, noirâtre, nauséabond". The colour of the food naturally depends on that of the pollen of the flowers visited, but it is not correct to speak of honey alone.) On the food-paste a slender egg, about 4 mm. long, et was floating, or a young, newly-hatched larva. Whether originally the egg had been fastened to the wall of the cell I have not been able to discover.



A. still open and empty cell.
 B. closed cell with food-paste and egg.
 C. upper side of cell with opening (enlarged).

It proved to be not so very simple to rear the larvae in the opened cells. The mixture of pollen and honey dried very soon, necessitating a daily moistening of the food with a small paintbrush dipped in water, so that the paste remained soft enough to be taken by the grubs. The disadvantage was, however, that the foodpaste very easily grew mouldy as I had to keep the cells in little glass tubes.

The great number of cells in the soil with dried up food contents, including the egg or young larvae, was very remarkable. I found also some dead bees of the previous year in cells which were still closed.

In the beginning of June most of the larvae were fullgrown. The faeces, of brownish colour, were half-liquid when excremented and smeared halfway the height of the cell. The fullgrown grub, after the voidance of the faeces — it then has a wrinkly appearance, whilst before the voidance it was smooth and shining — has the little head curved downwards and then measures about 15 mm from the tail to the curve of the neck with a breadth of 6 mm. The little head has a breadth of $1\frac{1}{2}$ mm only. The mandibles, which are darkbrown at the end, are cut off abruptly. For the rest the larva in this stage is wholly yellowish-white.

On the 3rd of July the first larva began to pupate. On the 11th of July the pupa had lightbrown eyes, which after three days became darkbrown, whilst the tips of the mandibles were darker. On the 5th of August the thorax and mouth-parts, the clypeus and the margins of the abdominal segments were black for the greater part. A great number of hairs on the head, thorax and abdomen were clearly visible through the pupal skin. On the 10th of August the pupa was wholly black, the hairs being no longer visible and on the 12th of August the first bee, a female, hatched.

When examining the colony on the 22nd of August I found that a great number of pupae were about to hatch and apparently there was not a very big difference in the stage of growth as compared with those reared indoors.

I also found then some pupae of *Melecta armata* Panzer, the well-known food parasite, which I had already found amidst the colony as a perfect insect in spring. These pupae are somewhat smaller and, besides the white patches on the abdomen shining through, they differ from those of *Anth. acervorum* also by the peculiar protuberances on the thorax. On the back portion of the scutum of *Anth. acervorum*, when about to hatch, we find two small black humps which are directed with their tops towards the rear, whilst two larger humps on the scutellum are bent forward in the direction of the head. *Melecta armata*, however, has two bigger humps on the scutellum with their tops pointing backward and in the middle of the scutum there are no black humps, but two small white oblong protuberances, each bearing on their top eight tiny brown spines.

These protuberances, which remain white, even when the rest of the pupa is wholly black, are flattened and have an oblique position so that their fronts form an angle of about 45 degrees with the longitudinal axis of the scutum, the outer side of the protuberances being most near to the anterior margin of the thorax. For further particulars on the pupa of *Melecta armata* I can refer to S e m i c h o n : Sur la nymphe de *Melecta armata* Panzer (Bull. Soc. entom. France, 1922, p. 192—194). S e m i c h o n also gives two pictures of the protuberances on the scutellum, which protuberances, however, were not of such a regular shape as those I have examined.

For a month now I have kept the hatched *Anthophora acervorum* in glass tubes, in which they are lying almost immovable, only moving their feet when disturbed. It is doubtful whether in this unnatural state they can maintain their reserves sufficiently to be able to fly out next spring.

P.S. L i n s l e y and M a c S w a i n described the nest of the North American species *Anthophora stanfordiana* Cockerell in 1942 (Bionomics of the Meloid Genus *Hornia*, University of California, vol. 7, No. 9, pp. 189—206, 2 plates). They found that the cells "are constructed indi-

vidually, waterproofed by a waxlike oral secretion, and provided with pollen, water, and a little honey". Although they do not mention the small aperture in the middle of the upper side of the cell, their fig. 7 (plate 7) seems to show the same opening. *Anth. stanfordiana*, which appears later in spring, does not hibernate as an adult bee, however, but in the prepupal stage.

Rotterdam, Allard Piersonstr. 28c, September 1946.

Siphonaptera Neerlandica Faunae Novae Species I

by
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Referring to the list of fleas which may be expected in the Netherlands (vide Entom. Berichten, 1947, 12: 171) I should like to record the discovery of three species new to the Dutch fauna.

1. *Malaraeus penicilliger* Gr.

Wilp (Guelders),

- a) 1-VII-1947, 1 ♂ on *Microtus arvalis*.
- b) 14-VIII-1947, 1 ♂ on *Talpa europaea*, leg. W. C. van Heurn.
- c) Sept. 1947, 1 ♂ on *Clethrionomys glareolus*, leg. W. C. van Heurn.
- d) Sept. 1947, 1 ♂, 2 ♀♀ on *Erinaceus europaeus* (!), leg. W. C. van Heurn.

2. *Doratopsylla dasyncnemus* Roths.

Wilp (Guelders),

- a) 18-VII-1947, 1 ♂ on *Sorex araneus*.
(I did not find this specimen on the mouse itself, but in the debris at the bottom of a drain-pit into which the mouse had fallen. As this drain-pit had been free of mice for several weeks, and in view of the fact that *Palaeopsylla sorecis*, a species as characteristic for Soricidae as *Dor. dasyncnemus*, was also found among the debris, there can be little doubt that *Sorex araneus* was the host).
- b) 14-VIII-1947, 1 ♀ on *Talpa europaea*, leg. W. C. van Heurn.

3. *Megabothris walkeri* Roths.

Heumen (near Nijmegen), 31-VIII-1947, 2 ♂♂, 2 ♀♀ on *Clethrionomys glareolus*.

I should like to express my sincere thanks to Jonkheer W. C. van Heurn, whose hospitality enabled me to stay on his estate „Kleine Noordijk" at Wilp for some weeks, in order to trap mice in the surrounding woods. It was there that I captured the first two new species mentioned, in addition to a lot of other material. Jhr. van Heurn is one of the very few zoologists who preserve ectoparasites when they come across them, and send the material to a specialist. It is a general complaint among parasitologists that, as a rule, neither ornithologists nor mammalogists take any notice of the ecological unit consisting of the host and its parasites. It is an agreeable surprise, therefore, to find an exception.

Nijmegen, Sumatrastraat 13, September 1947.